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L-forbidden M1 transitions in N=50 isotones

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Regions near closed shells in areas of the nuclear chart far from stability are very interesting from the point of view of nuclear structure, since they provide an ideal testing ground to investigate the competition between single particle degrees of freedom and collective effects from many nucleons. This is the case for nuclei near the doubly-magic ^{78}Ni nucleus, with Z = 28 and N = 50 [1]. The systematics of transitions from the first-excited states of the even-A N = 50 isotones [2, 3] is very enlightening, since M1 transitions are expected to be l forbidden, resulting in long half-lives with small transition probabilities [4-6].

A more complete understanding of these l forbidden M1 transitions could be achieved by extending the systematics. To this end, two complementary experiments were performed at two different facilities: ISOLDE (CERN) and ILL (Grenoble, France).

The first experiment aimed to study the half-life of the first excited state of the ^{83}As via a β-decay experiment of ^{83}Ga at the ISOLDE Decay Station during a recent beam test. These nuclei were produced via fission induced by fast neutrons in a UC_x target.

In the second experiment, the half-lives of the first excited states in ^{85}Br and ^{87}Rb [7] were investigated at the LOHENGRIN spectrometer at ILL. Here, the nuclei of interest were produced by a fission experiment at ILL, where the parent nuclei, ^{85}Se and ^{87}Kr, were transported and mass-separated by the LOHENGRIN spectrometer.

In the following, I will present a preliminary analysis of both experiments, discussing the methodologies used and the initial results obtained. Additionally, I will draw some conclusions regarding the systematics of the l-forbidden M1 transitions, highlighting their implications for nuclear structure

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